4 Result on $\nabla(a{\cdot}b)$ from H+S

The result on $\nabla(a{\cdot}b)$ from Hestenes & Sobczyk we have difficulty remembering is ((1.43) on p53):

$$\nabla(a{\cdot}b) = a{\cdot}\nabla b + b{\cdot}\nabla a - a{\cdot}(\nabla{\wedge}b) - b{\cdot}(\nabla{\wedge}a) \tag{15}$$

5 Some further hard to remember algebraic results

From H+S p12:

$$a{\cdot}(A_r{\wedge}B_s) = (a{\cdot}A_r){\wedge}B_s + (-1)^r A_r{\wedge}(a{\cdot}B_s) \tag{16}$$

and for $s \geq r > 1$

$$a{\wedge}(A_r{\cdot}B_s) = (a{\cdot}A_r){\cdot}B_s + (-1)^r A_r{\cdot}(a{\wedge}B_s) \tag{17}$$

Note $r = 1$ case fits in as follows:

$$a{\wedge}(b{\cdot}B_s) = (a{\cdot}b)B_s - b{\cdot}(a{\wedge}B_s) \tag{18}$$

Also two very important ones from p7:

$$\begin{aligned} A_r{\cdot}(B_s{\cdot}C_t) &= (A_r{\wedge}B_s){\cdot}C_t \quad \text{for } r+s \leq t \text{ and } r,s>0 \\ A_r{\cdot}(B_s{\cdot}C_t) &= (A_r{\cdot}B_s){\cdot}C_t \quad \text{for } r+t \leq s \end{aligned} \tag{19}$$

Another one from p15:

$$(b{\wedge}a){\times}A = b{\wedge}(a{\cdot}A) - a{\wedge}(b{\cdot}A) \tag{20}$$